

What is Claimed is

1. A display device comprising:
  - a display part having a plurality of pixels;
  - a plurality of video signal lines which apply a video signal voltage to the plurality of pixels; and
  - a drive circuit which supplies the video signal voltage to the plurality of video signal lines, wherein the drive circuit includes:
    - a) a storage circuit which stores display data inputted from the outside;
    - b) a reference data generating circuit which generates reference data;
    - c) a ramp voltage generating circuit which generates a ramp voltage;
    - d) a plurality of comparing circuits which compare the display data stored in the storage circuit and the reference data generated by the reference data generating circuit, and
    - e) a plurality of sampling circuits which sample the ramp voltage generated by the ramp voltage generating circuit based on a result of comparison of the comparing circuit and output the sampled ramp voltage as a video signal voltage to respective video signal lines, wherein the reference data generated by the reference data generating circuit is changed non-linearly with respect to time.

2. A display device comprising:

- a display part having a plurality of pixels;
- a plurality of video signal lines which apply a video signal voltage to the plurality of pixels; and
- a drive circuit which supplies the video signal voltage to the plurality of video signal lines, wherein the drive circuit includes:
  - a) a storage circuit which stores display data inputted from the outside;
  - b) a reference data generating circuit which generates reference data;
  - c) a ramp voltage generating circuit which generates a ramp voltage of positive polarity and a ramp voltage of negative polarity,;
  - d) a plurality of comparing circuits which compare the display data stored in the storage circuit and the reference data generated by the reference data generating circuit, and
  - e) a plurality of sampling circuits which sample the ramp voltage of positive polarity or the ramp voltage of negative polarity generated by the ramp voltage generating circuit in response to an alternating signal inputted from the outside and the result of comparison of the comparing circuits and output the sampled ramp voltage to respective video signal lines as a video signal voltage, wherein the reference data generated by the reference data

generating circuit is changed non-linearly with respect to time.

3. A display device comprising:

a display part having a plurality of pixels;

a plurality of video signal lines which apply a video signal voltage to the plurality of pixels; and

a drive circuit which supplies the video signal voltage to the plurality of video signal lines, wherein

the drive circuit includes:

a) a storage circuit which stores display data inputted from the outside;

b) a reference data generating circuit which generates reference data;

c) a ramp voltage generating circuit which generates a ramp voltage of positive polarity and a ramp voltage of negative polarity;

d) a plurality of comparing circuits which compare the display data stored in the storage circuit and the reference data generated by the reference data generating circuit, and

e) a sampling circuit to which a comparing result of the two neighboring comparing circuits is inputted and outputs video signal voltages of polarities which are opposite to each other to the neighboring video signal lines, wherein

the sampling circuit includes

i) a first sampling circuit which samples the ramp

voltage of positive polarity generated by the ramp voltage generating circuit in response to an inputted result of comparison of one comparing circuit out of two comparing circuits,

ii) a second sampling circuit which samples the ramp voltage of negative polarity generated by the ramp voltage generating circuit in response to an inputted result of comparison of another comparing circuit out of two comparing circuits,

iii) a first switching circuit which inputs the inputted result of comparison of one of comparing circuit out of two comparing circuits to either the first sampling circuit or the second sampling circuit and the inputted result of comparison of another comparing circuit out of two comparing circuits into either the second sampling circuit or the first sampling circuit in response to an alternating signal inputted from the outside in response to an alternating signal outputted from the outside, and

iv) a second switching circuit which outputs the ramp voltage of positive polarity sampled by the first sampling circuit to one video signal line or another video signal line out of neighboring video signal lines as a video signal voltage, or outputs the ramp voltage of negative polarity which is sampled by the second sampling circuit to another video signal line or one video signal line out of the neighboring video

signal lines as a video signal voltage in synchronism with the changeover at the first switching circuit in response to the alternating signal.

4. A display device according to claim 3, wherein a buffer amplifying circuit which amplifies the sampled ramp voltage is provided in a stage prior to the second switching circuit.

5. A display device according to claim 3 or claim 4, wherein the reference data generated by the reference data generating circuit changes non-linearly with respect to time.

6. A display device according to claim 1, claim 2 or claim 5, wherein the reference data generating circuit includes:

a selection circuit to which a plurality of clocks which have different frequencies from each other are inputted and selects one clock out of the plurality of clocks in response to a selection control signal;

a counter which counts clocks selected by the selection circuit and outputs the number of counts as the reference data; and

a control part which transmits the selection control signal which indicates the clocks to be selected by the selection circuit in response to a preset number of counts and the number of counts of the counter.

7. A display device according to claim 6, wherein the

control part includes:

a plurality of registers which store the preset number of counts;

a plurality of comparators which compare the number of counts stored in respective registers and the number of counts of the counter;

a control circuit which generates the selection control signals in response to a result of a comparison at the plurality of comparators.

8. A display device according to any one of claim 1 to claim 7, wherein the drive circuit is integrally formed on a substrate on which the display part is formed using thin film transistors.